

WHAT IS CLAIMED IS:

1 1. A method for distributing Quality of Service (QoS) information among
2 network entities to flexibly promote fair congestion processing, comprising:
3 monitoring a congestion level within a network entity;
4 performing a QoS action in response to determining that the congestion
5 level exceeds a congestion threshold; and
6 communicating the QoS action to at least one other network entity, wherein
7 the at least one other network entity alters its congestion processing in response to the QoS
8 action taken by the network entity.

1 2. The method according to Claim 1, wherein monitoring the congestion level
2 comprises:
3 receiving data streams from a plurality of network entities;
4 storing the data streams within a buffering system; and
5 monitoring a storage level of the buffering system.

1 3. The method according to Claim 2, wherein performing the QoS action
2 comprises recording QoS actions taken by the plurality of network entities.

1 4. The method according to Claim 3, wherein performing the QoS action
2 further comprises:
3 retrieving the recorded QoS actions; and
4 prioritizing the recorded QoS actions into an order starting with the least most
5 recently modified data stream to the most recently modified data stream.

1 5. The method according to Claim 4, wherein performing the QoS action
2 further comprises at least one of dropping data packets, modifying data packets and
3 delaying data packets from the least most recently modified data stream.

1 6. The method according to Claim 1, wherein communicating the QoS action
2 comprises providing signalling information indicative of the QoS action within the data
3 stream.

1 7. The method according to Claim 1, wherein communicating the QoS action
2 comprises providing out-of-band signalling information indicative of the QoS action.

1 8. A system for distributing Quality of Service (QoS) actions in accordance
2 with precedence priorities to promote fair congestion processing within a network, the
3 system comprising:

4 a network element coupled to a boundary of the network;

5 a first forwarding terminal coupled to exchange a plurality of data streams
6 with the network element and adapted to implement QoS actions on a first portion of the
7 plurality of data streams, the first portion receiving a first precedence priority in response
8 to the QoS actions; and

9 a second forwarding terminal coupled to exchange the plurality of data
10 streams with the first forwarding terminal and coupled to receive signalling indicative of
11 the QoS actions implemented by the first forwarding terminal, wherein QoS actions taken
12 by the second forwarding terminal are performed upon a second portion of the plurality of
13 data streams having a second precedence priority equal to or higher than the first
14 precedence priority.

1 9. The system according to Claim 8, wherein the first forwarding terminal
2 comprises:

3 a routing unit coupled to receive the plurality of data streams from the
4 network element, the plurality of data streams containing signalling indicative of prior QoS
5 actions;

6 a buffering unit adapted to temporarily store the plurality of data streams
7 received from the routing unit;

8 a congestion control unit adapted to monitor a storage level of the buffering
9 unit; and

10 a QoS unit adapted to perform the QoS actions, wherein the QoS actions taken by
11 the QoS unit are adapted to reduce the storage level of the buffering unit by dropping,
12 modifying or delaying packets of data from the first portion of the plurality of data
13 streams.

1 10. The system according to Claim 9, wherein the first forwarding terminal
2 further comprises a marking unit adapted to mark the first portion of the data streams with
3 the first precedence priority.

1 11. The system according to Claim 8, wherein the second forwarding terminal
2 comprises:
3 a routing unit coupled to receive the plurality of data streams from the first
4 forwarding terminal, the plurality of data streams containing signalling indicative of
5 Quality of Service actions taken by the first forwarding terminal;
6 a buffering unit adapted to temporarily store the plurality of data streams
7 received from the routing unit;
8 a congestion control unit adapted to monitor a storage level of the buffering
9 unit; and
10 a Quality of Service (QoS) unit adapted to perform the QoS actions, wherein the
11 QoS actions taken by the QoS unit are adapted to reduce the storage level of the buffering
12 unit by dropping, modifying or delaying packets of data from the plurality of data streams
13 whose signalling indicates a lack of QoS actions taken by the first forwarding terminal.

1 12. The system according to Claim 11, wherein the second forwarding terminal
2 further comprises a marking unit adapted to mark the second portion of the data streams
3 with a precedence priority indicative of the QoS actions taken by the second forwarding
4 terminal.

1 13. A communication device operable on a network, comprising:
2 a routing unit coupled to receive a plurality of data streams from the
3 network, the plurality of data streams containing signalling indicative of prior Quality of
4 Service (QoS) actions taken on the plurality of data streams;
5 a buffering unit adapted to temporarily store the plurality of data streams
6 received from the routing unit;
7 a congestion control unit adapted to monitor a storage level of the buffering
8 unit; and
9 a QoS unit adapted to perform QoS actions on the plurality of data streams,
10 wherein the QoS actions taken by the QoS unit are adapted to reduce the storage level of
11 the buffering unit by acting on packets of data from the plurality of data streams whose
12 signalling indicates a lack of prior QoS actions.

1 14. The communication device according to Claim 13, wherein the routing unit
2 bypasses the QoS unit if the storage level of the buffering unit is below a storage threshold.

1 15. The communication device according to Claim 14, wherein the routing unit
2 engages the QoS unit if the storage level of the buffering unit is above a storage threshold.

1 16. The communication device according to Claim 15, wherein the QoS unit
2 comprises a QoS action unit coupled to receive the plurality of data streams when the
3 storage threshold is exceeded and adapted to drop, modify or delay the data packets from
4 the plurality of data streams indicating the lack of prior QoS actions.

1 17. The communication device according to Claim 16, wherein the QoS unit
2 further comprises a QoS action history unit coupled to the QoS action unit and adapted to
3 maintain a history of prior QoS actions taken on the plurality of data streams.

1 18. The communication device according to Claim 17, wherein the QoS action
2 history unit is further adapted to maintain a history of QoS actions taken on the plurality of
3 data streams by the QoS action unit.

1 19. The communication device according to Claim 16, wherein the QoS unit
2 further comprises a packet marking unit coupled to the QoS action unit and adapted to
3 mark the plurality of data streams whose data packets were dropped, modified or delayed
4 by the QoS action unit.

1 20. A computer-readable medium having instructions stored thereon which are
2 executable by a computing system for applying Quality of Service (QoS) actions on data
3 streams exchanged between at least two applications over a network by performing steps
4 comprising:

5 receiving data streams from the at least two applications, the data streams
6 including signalling information indicative of prior QoS actions;

7 applying a QoS action on one of the at least two data streams in response to
8 detecting a need to perform the QoS action, wherein the application of the QoS action
9 performs steps comprising:

10 retrieving a history of prior QoS actions taken on each of the at least
11 two data streams;

12 prioritizing the history of prior QoS actions, wherein prior QoS
13 actions taken most recently receive a low priority;

14 selecting one of the at least two data streams having a priority level
15 equal to or greater than the low priority; and

16 applying the QoS action to the selected data stream.